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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,363	03/01/2004	Brian J. McDermott	ConCir-P1-04	9366
28710	7590	07/13/2005	EXAMINER	
PETER K. TRZYNA, ESQ.			DINH, TUAN T	
P O BOX 7131			ART UNIT	
CHICAGO, IL 60680			PAPER NUMBER	

2841

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/790,363

Applicant(s)

MCDERMOTT ET AL.

Examiner

Tuan T Dinh

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-180 is/are pending in the application.
- 4a) Of the above claim(s) 1-90 and 180 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 91-179 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date 4/2/08
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-90, and 180, drawn to a process for making an electrical device, classified in class 29, subclass 830+.
 - II. Claims 91-179, drawn to an electrical device, classified in class 174, subclass 255+.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the Invention I can be made by a subtraction methods such as etching away a blank to form a conductive layer instead of the step of building up the conductive layer.

2. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
3. Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr. Peter K. Trzyna (Reg. No. 32,601) on 01/12/05 a provisional election was made with traverse to prosecute the invention of Group II, claims 91-179. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-89, and 180 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because: reference character **"8"** has been used to designate both **dielectric material** and **a conductive coating**, see page 11, lines 7-8, and reference character **"10"** has been used to designate both **via holes** and **the conductive coating**, see page 12, lines 2-3.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet

submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to because figure 1 does not proper show cross-hatchings of a dielectric material 8, a conductive layer 10, and a metal layer 18.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

8. The disclosure is objected to because of the following informalities:

Page 8, line 19, change "per square 200,000 per square inch" to - - 200,000 per square inch - - for proper reading.

Appropriate correction is required.

Claim Objections

9. Claims 96, 101, 107, 118, 124, 127, 131-133,136 are objected to because of the following informalities:

The phrase of "the conductive layer is built up...at least one of the conductive layer and or the portion of the dielectric layer" is not understood. Since in claim 1, line 4, the applicant recited "a conductive layer built up on the dielectric layer", so that it seems (one) the conductive layer built on the dielectric layer. Also, claim 96, it seems more than one of the conductive layer built up on the dielectric. Does applicant means there are more than one of the conductive layer built up on the dielectric?

Examiner assumes that the phrase would be changed to - - the conductive layer built up to...integrity of the portion of the dielectric layer - - for proper reading.

Claim 133, "the conductive material and the dielectric layer" should be changed to - - the dielectric layer - - for proper antecedence basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 91-137, 144-145, 158-159, 172-173 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakamura (U.S. Patent 5,517,758).

As to claim 91, Nakamura discloses an electrical device as shown in figures 1-9 including:

a dielectric material (2, column 4, line 57, column 5, lines 39-40) having cavities (3, see figure 1C) remaining from removal of a portion (1) of the dielectric material (2),

a conductive layer (4, column 6, line 52) built up on the dielectric material (2) to filled the cavities (3) so as to set in and under the dielectric material, and

wherein the conductive layer (4) is a portion of circuitry (or element 77 of figure 7E) of the electrical device.

As to claim 97, Nakamura discloses an electrical device as shown in figures 1-9 including:

a dielectric material (2) having cavities (3) remaining from removal of a portion (1) of the dielectric material (2),

a conductive layer (4) built up on the dielectric material (2) to fill the cavities (3) to form a surface of substantially angular teeth set in the dielectric material (2), and

wherein the conductive layer (4) is a portion of circuitry (element 77 of figure 7) of the electrical device.

As to claim 102, Nakamura discloses an electrical device as shown in figures 1-9 including:

a conductive layer (4) of material built up on a layer of a dielectric material (2), the layers (4, 2) joined in a saw-tooth manner (see figure 1) made of both materials in an interlocking bite; wherein the conductive layer (4) is a portion of circuitry of the electrical device.

As to claim 108, Nakamura discloses an electrical device as shown in figures 1-9 including: a conductive layer (4) having a surface built up to under-cuttings in a dielectric material (2), wherein the conductive layer (4) is a portion of circuitry of the electrical device.

As to claim 110, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2) with cavities (3) remaining after removal of a portion (1) of the dielectric material sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%, see figure 1, and electrical device circuitry comprised of a conductive layer (4) built up to fill the cavities.

As to claim 115, Nakamura discloses an electrical device as shown in figures 1-9 including: a dielectric material (2), and electrical device circuitry comprising a conductive layer (4) built up on the dielectric material (2) at a dielectric surface area greater than a dielectric surface area that would be produced by a single pass roughening (the figure 1D contains the conductive layer 4 having a dielectric surface contact area greater than

a dielectric surface contact area that would be produced by a single pass roughening comparing of the Prior art of figure 2 in the application).

As to claim 119, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2), a conductive layer (4) forming a portion of circuitry of the electrical device, and means for joining the conductive layer to the dielectric material, the means including teeth built up on the dielectric material and angled sufficiently (see figure 1).

As to claim 120, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2); and means for joining a conductive layer (4) built up on the dielectric material to produce a peel strength greater than a peel strength that would be produced by a single desmear process, see table 1, column 6, wherein the conductive layer is a portion of circuitry.

As to claim 122, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2), and electrical device circuitry comprising a conductive layer (4) built up on a surface of the dielectric material to produce a peel strength greater than a peel strength that would be produced by a single desmear process, see table 1.

As to claim 125, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2) having a surface remaining from removal of a portion (1) of the dielectric material, and means for mechanically gripping a conductive layer (4) to the surface of the dielectric material (2) so that the conductive layer is borrowed in

and under the dielectric material, wherein the conductive layer (4) forms a portion of circuitry of the electrical device.

As to claim 127, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2), and electrical device circuitry comprising a conductive layer (4) built up on the dielectric material sufficiently that separation requires destroying integrity of the portion of the dielectric material.

As to claim 129, Nakamura discloses an electrical device as shown in figures 1-9 including: a dielectric material (2) having a surface gloss measurement at an angle of 60 degrees of less than 10%; and circuitry of the electrical device comprised of a conductive layer (4) on the dielectric material (2).

As to claim 134, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2), and means for joining a conductive layer (4) built up on the dielectric material (2) at a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening the figure 1D contains the conductive layer 4 having a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening comparing of the Prior art of figure 2 in the application), wherein the conductive layer is a portion of circuitry of the electrical device.

As to claim 136, Nakamura discloses an electrical device as shown in figures 1-9 including a dielectric material (2), and means for joining a conductive layer (4) built up on the dielectric material sufficiently that separation requires destroying integrity of a

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portion of the dielectric material, said means for joining comprising filled cavities (3) that form a portion of circuitry of the electrical device.

As to claims 92, 98, 104, Nakamura discloses the removal of the portion (1) as shown in figure (1) is sufficient to produce a surface gloss measurement at an angle of 60 degrees of less than 10%, it can be seen from figure (1) that the opening (3) having an angle, which is approximately 60 degrees.

As to claims 93, 103, 109, 111, 116, 121, 123, 126, 128, 130, 135, 137, Nakamura discloses the conductive layer (4) built up to fill the cavities (3) as shown in figure (1) is comprised of teeth.

As to claims 94, 99, 105, 112, Nakamura discloses the conductive layer (4) has a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening (the figure 1D contains the conductive layer 4 having a dielectric surface contact area greater than a dielectric surface contact area that would be produced by a single pass roughening comparing of the Prior art of figure 2 in the application).

As to claims 95, 100, 106, 113, 117, Nakamura discloses the conductive layer (4) is built up to fill in the cavities (3) sufficient for a peel strength greater than a peel strength that would be produced by a single desmear process, see table 1, column 6.

As to claims 96, 101, 107, 114, 118, 124, 131-133, Nakamura discloses the conductive layer (4) is built up to fill in the cavities (3) sufficiently that separation requires destroying integrity of the portion of the dielectric material.

As to claims 144-145, Nakamura discloses a sample of the circuitry having at least 20% of the teeth having a shape that mechanically grips the dielectric layer (2), and 50% of the teeth that are obtuse shaped.

As to claims 158-159, Nakamura discloses the device in figures 7-9 the circuitry of the electrical device is comprised of multi-layer circuitry, one of said multi-layers having said teeth and another of said layers having corresponding teeth

As to claims 172-173, Nakamura discloses the device as shown in figures 7-9 the circuitry is comprised of double sided circuitry, one side having said teeth and another side having corresponding teeth (top and bottom surface having teeth).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 138-143, 152-157, 166-171 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (U.S. Patent 5,517,758).

Regarding claims 138-143, Nakamura discloses all of the limitations of the claimed invention, except for a sample of the circuitry having at least 5,000-15,000 teeth per linear inch or 25,000-200,000 teeth per square inch.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use amount of teeth per linear inch or square inch in order to

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minimize a thermal expansion stress among layers and improve an excellent bonding between of each of layer formed the circuit board, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) and In re Aller, 105 USPQ 233 (CCPA 1955).

As to claims 152-157, Nakamura discloses the device in figures 7-9 the circuitry of the electrical device is comprised of multi-layer circuitry, one of said multi-layers having said teeth and another of said layers having corresponding teeth

As to claims 166-171, Nakamura discloses the device as shown in figures 7-9 the circuitry is comprised of double sided circuitry, one side having said teeth and another side having corresponding teeth (top and bottom surface having teeth).

14. Claims 146-151, 160-165, 174-179 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (' 758) in view of Larson (U.S. Patent 5,774,336).

Nakamura discloses all of the limitations of the claimed invention, except for a sample of the circuit board has at least 20% or 50% of the teeth are within the range of at least 1 tenth of 1 mil deep to 2 tenths of a mil deep.

Larson discloses the circuit board as shown in figure 2 wherein a sample of the circuit board has at least 20% or 50% of the teeth are within the range of at least 1 tenth of 1 mil deep to 2 tenths of a mil deep (see thickness of portion A, column 5, line 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of Larson employ in the device of Nakamura in order to provide an excellent bonding purpose.

As to claims 160-165, Nakamura discloses the device in figures 7-9 the circuitry of the electrical device is comprised of multi-layer circuitry, one of said multi-layers having said teeth and another of said layers having corresponding teeth.

As to claims 174-179, Nakamura discloses the device as shown in figures 7-9 the circuitry is comprised of double sided circuitry, one side having said teeth and another side having corresponding teeth (top and bottom surface having teeth).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Tuan Dinh', with a long, sweeping horizontal line extending to the right.

Tuan Dinh
July 11, 2005.